Before answering the question paper the candidate should ensure that they have been supplied the correct question paper. Complaints in this regard, if any, shall not be entertained after the examination.

**Note:** Question No. 1 is Compulsory and attempt two questions from each section. All questions carry equal marks.

1. Write short notes on the following: [5x4]
   a. Coordination no and Atomic packing factor
   b. Bauschinger effect
   c. Strain Hardening
   d. Creep curve

**SECTION-A**

2. (a) What do you mean by surface defects in crystals? Classify them with neat sketches? [10]
   (b) What do you mean by crystal lattics? Name seven crystal system based on Bravais lattics? [10]

3. (a) Define Burger vector. Differentiate between edge dislocation and screw dislocation. [10]
   (b) Describe surface and volume defects. [10]

4. (a) Define the term heat treatment and its purpose. [5]
   (b) Explain following Heat treatment process:
     (i) Annealing
     (ii) Normalising
     (iii) Hardening and Tempering [15]

**SECTION-B**

5. (a) Distinguish between terms recovery and recrystalisation involved in the process of heating cold worked metals. [10]
   (b) What is Gibbs phase rule and what is its reduced form for alloy system. Calculate No. of phases present in a three component system for a degree of freedom equal to 2. Also find out maximum no. of possible equilibrium phases in the system? [10]

6. What is the difference in hardening and hardness of the materials? What are the various methods of hardening of low carbon steel? Explain in detail? [20]

   (b) What are ceramic materials? Give their classification. [10]